

which would inevitably follow an adequate encouragement of research, the irony of the position becomes more evident. It was stated on authority that Pasteur during his lifetime saved for his country the whole cost of the Franco-Prussian War. It is computed that nearly one and three-quarter millions of our population are to-day dependent for their living upon industries connected with the mechanical generation of electricity—a population which may be said, without undue use of imagery, to be living on the brain of Faraday. We possess mathematicians who, granted encouragement, opportunity, and time, could establish laws of stability of aeroplanes. Suppose we spent some millions in discovering the man and enabling him to complete his task; the result might be an addition to our security greater than that of a fleet of super-Dreadnoughts. Unfortunately, there are no votes to be gained by the advocacy of opportunities for research!

Associations such as ours should spare no effort to bring home to the minds of the people the truth of the statement that the prosperity of this kingdom is dependent on its industries, and that those industries are founded on applied science.

Some years ago the *Petit Journal* invited its readers to answer the question, "Who were the twenty greatest Frenchmen of the nineteenth century?" No fewer than fifteen million votes were recorded. The resulting list included the names of nine scientific men, and Pasteur led by 100,000 votes over Victor Hugo, who came second, Napoleon securing the fourth place. It is obvious that a poll of such magnitude must have been representative of all classes. I ask you to reflect on the probable result, *mutatis mutandis*, if such a poll was taken in this country. I am afraid we should find the names of football and cricket heroes included, but I doubt if the name of a single man of science would appear amongst the immortals.

It should be our mission to make evident to the working man his indebtedness to the pioneers of science. Demonstrate to him the close connection between the price of his meat and the use of refrigerating processes founded on the investigations of Joule and Thomson; between the purity of his beer and the labours of Pasteur. Show the collier that his safety is to no small extent due to Humphry Davy; the driver of the electric tramcar that his wages were coined by Faraday. Make the worker in steel realise his obligation to Bessemer and Nasmyth; the telegraphist his indebtedness to Volta and Wheatstone, and the man at the "wireless" station that his employment is due to Hertz. Tell the soldier that the successful extraction of the bullet he received during the South African war was accomplished by the aid of Röntgen. Convince the sailor that his good "landfall" was achieved by the help of mathematicians and astronomers; that Tyndall had much to do with the brilliancy of the lights which warn him of danger, and that to Kelvin he owes the perfection of his compass and sounding line. Impress upon all wage-earners the probability that had it not been for the researches of Lister they, or some member of their family, would not be living to enjoy the fruits of their labours. If we can but bring some 5 per cent. of our voters to believe that their security, their comfort, their health, are the fruits of scientific investigation, then—but not until then—shall we see the attitude of those in authority towards this great question of the encouragement of research change from indifference to enthusiasm and from opposition to support.

When we have educated the man in the street it is possible that we may succeed in the hardest task of all, that of educating our legislators.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—A valuable addition to the equipment of the mining department of the University has been made in the form of an electrically-driven oil-boring derrick, which has been presented by the Oilwell Engineering Company, of Cheadle. The apparatus is capable of boring to a depth of 2000 ft., and by its means mining students will be able to acquire practical experience in the handling of oil-boring plant.

The following appointments have been made:—Mr. L. J. Wills, assistant lecturer in geology and geography; Mr. David Brunt, lecturer in mathematics (to succeed Mr. S. B. McLaren); Dr. C. L. Boulenger, reader in helminthology; Mr. H. G. Jackson, assistant lecturer in zoology.

By the will of the late Henry Follett Osler the University is to receive the sum of 10,000*l.*, with a prospective share in the residuary estate.

LEEDS.—The following appointments have been made to the staff of the University:—Mr. S. H. Stelfox, assistant lecturer and demonstrator in engineering; Mr. F. Powis, demonstrator in chemistry; Mr. E. Lee, assistant lecturer in agricultural botany; Mr. N. M. Comber, assistant lecturer in agricultural chemistry; Mr. D. B. Morgans, assistant lecturer and demonstrator in mining.

THE Concrete Institute has arranged a course of six educational lectures on reinforced concrete: its commercial development and practical application, to be given by Mr. H. Kempton Dyson, on Wednesdays in November and December, beginning on November 12. The lectures will be given in the Lecture Hall of the institute, Westminster. There is no fee for the course; admission will be by ticket, obtainable on application from the secretary, the Concrete Institute, Denison House, 296 Vauxhall Bridge Road, Westminster, S.W.

AN examination of the prospectus of the East Ham Technical College, which was opened in 1905, and on which some 33,000*l.* was spent, shows that the boroughs round London are fully alive to the importance of providing a practical training in technology and science for those engaged in the industrial pursuits of the locality. The work of the college is done in some eight departments, and important among these are those for men engaged in building trades, engineers, chemists, commercial men, and for women workers. The more elementary evening classes are held in three preparatory evening schools in different parts of the borough, but in the college itself a preparatory industrial course has been provided designed to enable students later to follow intelligently the lectures and laboratory work in the different departments of technology.

PRESIDING at a recent meeting of the Senate of Calcutta University, Sir Ashutosh Mookerjee made an interesting speech on some of the work of the University. According to a report of the speech given in *The Pioneer Mail*, the University has arranged for lectures for M.A. and M.Sc. students in eleven different branches of study, including pure mathematics and botany. The University has made itself directly responsible for the instruction of 1005 students in Calcutta in these subjects for the M.A. and M.Sc. examinations. Post-graduate teaching on this scale has never before been attempted in any Indian university, and that there is a genuine demand for higher instruction is established by the readiness with which students in large numbers have eagerly joined the classes in such subjects as pure mathe-

matics. The Government of India has made a liberal grant for the acquisition of a site, and plans have been nearly completed for further extension of the University buildings. When the new buildings are erected, there will be ample accommodation for the purposes of instruction, and, it will be possible to accommodate on the premises at least two hundred post-graduate students.

THE calendar for the session 1913-14 of the North of Scotland College of Agriculture has reached us. The classes of the college are held in the University of Aberdeen, except the class in agricultural engineering, which is held in Robert Gordon's Technical College, Aberdeen. The courses of instruction provided are arranged for the benefit of every section of the agricultural community. Persons who can attend the college only for four consecutive weeks in winter will find a short practical course extending over four weeks and including lectures on such subjects as feeding-stuffs, live-stock, diseases of animals, and so on. The full lectures on agriculture and agricultural chemistry extend over three years, but the complete course is modified in a variety of ways to meet particular needs and to enable students to secure the college diploma or the national diploma in agriculture. There is a special department of forestry, and for practical work, through the liberality of several landed proprietors, excellent facilities are afforded. The close proximity to Aberdeen of large wooded areas places it in an advantageous position for the teaching of forestry. Farmers residing within the college area are entitled to receive advice and assistance from members of the college staff free of charge. There is, also, a carefully arranged scheme of county extension work under the superintendence of a general county organiser.

THE calendar of the University of Sheffield for the session 1913-14, a copy of which has been received, provides striking evidence of the successful efforts which provincial universities are making to keep in close touch with the varied activities of the districts they serve. Not only does the University of Sheffield train students who desire to follow the usual academic courses which culminate in degrees in arts, pure science, medicine, law, and so on, but it provides also graduated instruction in such applied sciences as engineering, metallurgy, and mining, and awards degrees in these branches of technology to students who at the end of the training comply with the reasonable regulations specified in the calendar. To meet the special needs of students whose circumstances make it impossible for them to devote the time necessary for complying with the conditions for degrees, associateship and diploma courses have been arranged. The mining department of the University carries out a system of extension lectures in technical science in the West Riding of Yorkshire; a works pupils' certificate course has been arranged by the University in consultation with the Sheffield Master Builders' Association to meet the requirements of students who are working with the object of becoming master builders; a diploma course in domestic science has been inaugurated; and in other ways the University is assisting the higher education of Sheffield workers.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, October 13.—M. F. Guyon in the chair.—Paul Marchal: The acclimatisation of *Novius cardinalis* in France. In 1912 *Icerya purchasi* was accidentally introduced into France, at Cap Ferrat, and caused great damage. This plant pest has

been successfully fought in California and elsewhere by the introduction of its natural enemy, *Novius cardinalis*, and steps were taken to acclimatise this at Cap Ferrat. The results were completely successful, the *Icerya* being rapidly exterminated.—Charles Depéret: The fluvial and glacial history of the Rhône valley in the neighbourhood of Lyons. Evidence is given that there were three glacial invasions of this region and not two, as currently held, leading to the formation of three fluvio-glacial terraces.—Leopold Fejér: Trigonometric polynomials.—Michel Fekete: A property of the roots of the arithmetical means of a real integral series.—N. Gunther: The cononical form of algebraical equations.—M. Tomassetti and J. S. Zarlatti: The problem of two bodies of variable masses.—Thadée Peczalski: Relations between the coefficients of expansion and the thermodynamical coefficients.—France Giraud: Certain reactions depending on reply currents.—R. Dongier and C. E. Brazier: The sound effect produced at the contact of a metallic point and the surface of a crystal or a metal by the passage of an alternating current. A faint musical note was first noted in a galena detector at the Eiffel Tower. Means have been found to reinforce this note so that wireless signals can be heard at a distance of 22 metres from the apparatus.—Ch. Gravier: An automatic method of developing photographic plates.—B. A. Dima: The photo-electric effect of metallic compounds. The photo-electric effect of analogous compounds of the same metal depends on the valency of the metal in those compounds. The four oxides of manganese offer a clear example of this.—Yugi Shibata and G. Urbain: The spectrochemistry of the complex cobalt compounds. A study of the absorption bands in the visible and ultra-violet spectra of solutions of complex cobalt salts.—M. Taffanel and Le Floch: The combustion of gaseous mixtures. Mixtures of methane and air were heated to various temperatures between 535° C. and 640° C., and the rates of combustion measured. These results are extrapolated to evaluate the inflammation temperatures of these mixtures.—P. Lemoult: Leucobases and colouring matters of diphenylethylene. The first stage of oxidation of the cyclohexylidene leucobase,



Tetrahydro-malachite green.—C. Gerber and P. Flourens: The trypsin of *Calotropis procera* and the poison which accompanies it. The latex contains a proteolytic ferment very resistant to heat, and most active in alkaline or neutral media. It coagulates milk and digests casein and fibrin. Injected subcutaneously it is rapidly fatal to some animals (guinea-pig, pigeon), whilst in others it produces only local troubles (white rat, rabbit). Separation of the trypsin and the toxic substance has not been effected.—A. Gouvel: The genus *Palinurus* in Madagascar.—A. Brachet: The inhibiting action of the sperm of *Sabellaria alveolata* on the formation of the membrane of fertilisation of the egg of *Paracentrotus lividus*.—A. Paillet: Parasitic coccobacilli of insects.—Sabbat Stănescu: The structure of the crown of the elephant's molars.—Michel Longchambon: The breccia of the marmorean complex: conclusions which may be drawn concerning the age and the localisation of lherzolite.—François Picavet: The commemoration of Roger Bacon in 1914. It is proposed to publish a complete edition of Roger Bacon's works.

CAPE TOWN.

Royal Society of South Africa, September 17.—The president in the chair.—W. A. Jolly: The interpretation of the electrocardiogram. The interpretation of the electrocardiogram has remained doubtful, notwithstanding the large amount of work that has been